

**PARTICULATE MATTER
MONITORING NETWORK DESCRIPTION
FOR THE
SAN LUIS OBISPO COUNTY
MONITORING PLANNING AREA**

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1.0 INTRODUCTION

The rationale for PM_{2.5} sampling in the San Luis Obispo County Monitoring Planning Area is described below. PM_{2.5} sampling will determine San Luis Obispo County's compliance with new National Ambient Air Quality Standards which took effect on September 18, 1997. Two sites in the county which have been initially selected for this sampling are described.

1.1 Physical Setting

San Luis Obispo County has varied topography, climate, vegetation and population distribution within about 3,300 square miles of land area. The county is located on the central California coast midway between San Francisco Bay and the Mexican border. It is bounded on the north by Monterey County, on the east by Kern County, and on the south by Santa Barbara County.

A key feature of the county is a narrow coastal plateau which widens somewhat as it runs south. This extends from the north near the Monterey County line, to the southern border of the county at the Santa Maria River. The coastal Santa Lucia Range, which rises to heights of about 3,000 feet, separates the coastal plateau from the majority of the county's inland area to the east. On the eastern side of the coastal mountain range lie the Upper Salinas River Valley and a succession of low hills and valleys. These extend to the Temblor Range at the eastern county border, which separates San Luis Obispo County from the San Joaquin Valley.

1.2 Population Characteristics

In 1997, San Luis Obispo County's population reached 235,000, continuing to grow at a rate of about 1.5% per year. Of this population, 60% live in the county's seven cities, and 40% live in outlying unincorporated areas. With over 42,000 residents, the City of San Luis Obispo has about twice the population of each of the next largest cities, Atascadero and Paso Robles.

About 75% of the county's communities, population and commercial or industrial facilities are located on the coastal plateau. The remaining quarter of the county's population lives and works near the U.S. Highway 101 corridor, after it passes inland over the coastal range north from the City of San Luis Obispo and through the Upper Salinas River Valley. The eastern half of the county is rural agricultural land or is included in the Los Padres National Forest, and is very sparsely populated.

1.3 Climate and Weather

Climate in the Salinas River Valley and the eastern part of the county differs from that along the coast. Lands east of the coastal mountain range are more arid and typically have hot, dry summers and colder winters, much like those of the San Joaquin Valley. Near the coast,

temperatures are more mild and show less seasonal variation, due to the moderating influence of the Pacific Ocean. Rainfall near the coast varies with terrain and elevation, but typically reaches annual totals of 15 to 25 inches. During the spring and early summer, fog blankets coastal areas from late afternoon until the middle of the following day, as warm, moist marine air intrudes inland.

1.4 Dominant Economic Activities and Emission Sources

About half of the county's population is employed, and in 1997 the unemployment rate reached a ten year low of less than 5%. By far, most employees in the county (70%) work at or own private sector service businesses in the following categories: retail or wholesale trade, medical or educational services, finance, insurance, real estate, transportation, communications and utilities. About 17% of the county's workers are government employees, with almost half of those involved in public education from preschool to college levels. Manufacturing, construction and mining employ about 8%, and about 6% of jobs are in agriculture. With prime stretches of scenic undeveloped coastline, a good climate and other attractions, tourism remains a key focus for businesses in the county. Despite some variations which mirror the economies of California and the nation, the condition of San Luis Obispo County's economy has been judged "steady and healthy" in the 1998 Economic Outlook, a report by the UCSB Economic Forecast Project.

A variety of air pollutant emission sources and types contribute to ambient PM_{2.5} levels in San Luis Obispo County. Key PM_{2.5} sources are simple re-entrainment of roadway dust by vehicle traffic, open outdoor burning of agricultural wastes, and incomplete combustion in residential fireplaces and wood stoves. Significant amounts of PM_{2.5} are formed by condensation of pollutant gasses and other gas-to-particle conversion processes. A variety of gaseous combustion emission sources ranging private vehicles to a fossil fuel power plant and an oil refinery contribute to PM_{2.5} in this fashion. Additionally, because PM_{2.5} remains suspended for four days or more, it can be transported here from large metropolitan source areas which may be several hundred miles away.

In San Luis Obispo County, major industrial facilities or significant single sources of emissions which contribute to PM_{2.5} levels are the Tosco (formerly Unocal) refinery near Nipomo and the PG&E power plant at Morro Bay. Along with the Tosco refinery, facilities or air pollutant sources which produce, process or are involved with the transportation of petroleum include oil fields in Price Canyon and near Cuyama, marine terminals at Avila Beach and Estero Bay, and scattered oil pipeline pump stations. With much of the county's land devoted to ranching and agricultural production, open agricultural and range improvement burning is a key source of particulate matter emissions locally. Other varied and distributed pollutant emissions come from small commercial and manufacturing concerns, and collectively from the county's citizens, who contribute significantly to overall emissions through use of motor vehicles.

1.5 PM2.5 Monitoring Requirements

In San Luis Obispo County, the cities of San Luis Obispo, Atascadero and Paso Robles, combined with residential and commercial development between them, are classified as the San Luis Obispo-Atascadero-Paso Robles Metropolitan Statistical Area (MSA). An MSA designation denotes an urban, commercial and demographic region with a core population which shares common economic, environmental, residential and occupational attributes. For reasons of the separate MSA, regional geography and recognizing the San Luis Obispo County APCD's primary functional responsibility for ambient monitoring and air quality management here, San Luis Obispo County has been identified as a separate PM2.5 Monitoring Planning Area (MPA). The amendments to 40 CFR Parts 53 and 58 related to PM2.5 monitoring, published in the July 18, 1997 Federal Register, require at least one core SLAMS PM2.5 sampler to be operated in each MPA. An additional SLAMS site is warranted to provide adequate geographical representation over the diverse area in the MPA. Consequently, two existing SLAMS sites are proposed for PM2.5 sampling in the MPA, with both sites using FRM samplers. One device will operate at the existing San Luis Obispo air monitoring station, and two more samplers will be collocated at the existing Atascadero monitoring station.

2.0 PM2.5 MONITORING NETWORK ELEMENTS

Three PM2.5 samplers, as noted above, are scheduled for deployment and operation at two locations in San Luis Obispo County beginning in late 1998. Current indications are that these samplers will each be single channel FRM's. Initially, devices acquired by EPA and scheduled for deployment to this county will be acceptance-tested by ARB. After verifying acceptable performance, one will be received by the ARB technician who operates the San Luis Obispo monitoring station, and two will be received by the San Luis Obispo County APCD for installation and operation at Atascadero. In the future, the APCD intends to expand PM2.5 sampling in the MPA to other key sites, but additional PM2.5 sampling beyond these first two stations is not expected in 1999.

2.1 PM2.5 Monitors Planned for Deployment

The objective of PM2.5 sampling in the San Luis Obispo County MPA is to develop a database for comparison to the newly-adopted annual and 24-hour PM2.5 NAAQS. Sampling with the planned FRM single channel samplers will achieve this objective and allow meaningful designation of the MPA as either attainment or nonattainment of those standards. Locations and types of samplers in the MPA are indicated in the table below.

Table 2.1.1 PM2.5 Monitoring Network

Site Location	AIRS Site ID	PM2.5 FRM	PM2.5 Speciation	PM2.5 TEOM/BAM	Other PM2.5
Atascadero- Lewis Avenue	060798001	XX			
San Luis Obispo- Marsh Street	060792002	X			

Codes: X- single sampler; XX- collocated identical samplers

2.2 Existing Particulate Matter Monitors

Sampling for PM10 began in San Luis Obispo County at the San Luis Obispo- Marsh Street station in October, 1987, and at the Atascadero- Lewis Avenue station a year later. Within three additional years, PM10 samplers were added to five other existing permanent monitoring stations, creating the current network of seven sampling sites in the county. Basic gravimetric analysis alone has been performed on most of the PM10 samples taken at those locations over the years. Some additional chemical analyses have been performed on PM10 samples for selected periods at several of the sites.

In late 1993 the Atascadero- Lewis Avenue station was selected to be one of twelve monitoring sites in the Southern California network which was established for the ongoing multi-year USC/ARB Children's Health Study. The ARB Research Division coordinates special air monitoring efforts at these twelve locations. As part of the study, a TEOM sampler with a 10 μ size separation head was installed at Atascadero to monitor PM10 levels continuously. In addition, a Two-Week Sampler (TWS) was added, collecting 14-day integrated PM2.5 and acidic aerosol samples on a Teflon filter and on absorption media, for subsequent chemical analysis. The TEOM and TWS have run continuously at Atascadero since that startup date.

The locations and types of particulate samplers which are currently being operated in the county are listed below.

Table 2.2.1 Existing Particulate Matter Monitors

Site Location	AIRS Site ID	Dichot	PM10 SSI	PM10 TEOM/BAM	Other Particulate Matter Monitors
Atascadero- Lewis Avenue	060798001		X	X	Two week sampler
San Luis Obispo- Marsh Street	060792002		X		Coefficient of Haze
Paso Robles- Santa Fe Avenue	060790005		X		Coefficient of Haze
Morro Bay	060793001		X		
Nipomo- Regional Park	not yet assigned		X		
Arroyo Grande- Ralco Way	060791005		X		
Nipomo- Guadalupe Road	060792004		X		

2.3 PM2.5 Quality Assurance

The primary operators of all PM2.5 samplers in San Luis Obispo County, the ARB Monitoring and Laboratory Division and the San Luis Obispo County APCD, will implement all PM2.5 quality assurance procedures developed by the ARB Quality Assurance/Quality Control Branch, on the schedule they recommend. Please refer to the quality assurance section in the statewide section of this document for details.

2.4 Laboratory Analyses

No arrangements have been finalized at this time, but the laboratory facility which will most likely pre- and post-weigh filters for PM2.5 samplers operated by the San Luis Obispo County APCD at Atascadero will be the weighing facility expected to be established at the Ventura County APCD. Details of financial compensation to Ventura County for performing this service have yet to be resolved. Current indications are that filters for the PM2.5 sampler operated by the ARB at the San Luis Obispo- Marsh St. station will also be handled by the Ventura County facility. At this time, no speciation sampling and associated chemical analysis is anticipated for San Luis Obispo County.

3.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1998

All three PM2.5 samplers which are scheduled for operation at two sites in San Luis Obispo County will be deployed and operated in 1998. Detailed site information for each of these locations is presented below.

3.1 Monitor Siting

Both PM2.5 sampling sites in the county were selected with the primary objective of characterizing neighborhood population exposures to commonly-experienced and maximal levels of PM2.5. Sites were chosen which would be most representative of other similar areas in the county.

Existing air monitoring stations were candidates for adding PM2.5 monitoring if they had at least several years of monitoring data for other pollutants which could be used to confirm site representativeness. Each of the selected sites had over a decade of that supporting record, and each site has considerable historical PM10 data, in addition to continuing PM10 sampling for subsequent comparison with PM2.5 levels.

Each of the two selected sampling locations are in mixed-residential/small office/commercial areas of their communities, with moderate vehicle traffic on nearby streets. In general, their site features are very typical of those found in areas where a large majority of the county's citizens live and/or work.

Neither of the selected sites are strongly influenced by any significant nearby point or major sources of PM2.5 emissions. Furthermore, in this county no significant PM2.5 impacts are anticipated in areas adjacent to those few point or major sources which are located here. Therefore no specific source-receptor monitoring seems warranted in the county.

Atascadero With a population of over 25,000 in 1997, Atascadero is the second-largest city in San Luis Obispo County. Located near the southern end of the Upper Salinas River Valley, the city straddles U.S. Highway 101 as that highway passes inland from San Luis Obispo north over the coastal mountain range. Figure 3.1.1 shows a map of this portion of the county, and Figure 3.1.2 provides greater detail of Atascadero itself, identifying the specific location of the monitoring station.

The Atascadero- Lewis Lane monitoring station is adjacent to a neighborhood elementary school, and is effectively in a transition zone between small office/light commercial and residential portions of the town. The monitoring station is roughly 500 meters from Highway 101. Residential portions of the community begin within about a block on two sides of the site. The APCD has performed air monitoring at this location since November, 1988.

Comparison of ambient data from other stations in the county shows that pollutant levels at Atascadero and in Paso Robles, 10 miles north of Atascadero, often display similar patterns on

a given day. Pollutant levels at both locations reach similar daily maxima and rise or fall at about the same time. These patterns and maxima are usually different from those found at monitoring sites along the coast. Pollutant levels measured at both of these stations may reflect those found over much of the Upper Salinas River Valley in San Luis Obispo County, although the Atascadero- Lewis Avenue station site itself should be classed as having a neighborhood scale of representativeness.

Over the years, evidence has grown that at times, pollutants which are transported from the southern San Joaquin Valley affect air quality in the Atascadero/Paso Robles area. This appears to occur more frequently than the rate at which pollutants transported over a similarly long distance have been found to influence air quality west of the coastal mountain range.

The Atascadero- Lewis Avenue site is one of 12 locations which have been selected for the ongoing USC/ARB Children's Health Study. In this study, the respiratory health of over 5,000 individual schoolchildren in Southern California, along with detailed documentation of their exposures to ambient air pollutants, is being observed over a succession of years. As part of this health study, TEOM monitoring and two-week integrated PM2.5 sampling are being performed at Atascadero. PM2.5 sampling data acquired at Atascadero with an EPA FRM should prove to be a very useful addition to this health study. Sampling for PM2.5 will allow good data comparisons between PM10 SSI, PM10 TEOM, PM2.5 two-week sampler and PM2.5 FRM results.

San Luis Obispo To the extent that such a thing exists in San Luis Obispo County, the ARB monitoring station in San Luis Obispo, the county seat, best represents an urban setting. The city and its immediate surrounding area had a population of 45,500 in 1997, and the downtown business district is the largest in the county. Figure 3.1.3 is a detailed map of the San Luis Obispo and closely surrounding area, showing the specific location of the monitoring station. The station has been operated by the ARB at its current location since 1977, over a kilometer from the junction of U.S. Highways 1 and 101. That monitoring site is bordered on one side by the downtown business district and County Government Center, and on the other by a predominantly residential section of the city that is undergoing a slow multi-year transition into mixed small professional offices.

Monitoring results for PM2.5 at this location should be readily accepted by citizens of the city and county as either typical of or as a reasonable upper bound on PM2.5 levels that may be present in other parts of the city or in other cities in the county.

3.2 Site Descriptions

As described above, PM2.5 sampling will be initiated at two sites in San Luis Obispo County in 1998. Each site will utilize one or two FRM monitors as core SLAMS. The devices will be obtained from EPA through national purchase contracts. Data from both locations will be usable for comparison to the annual average and 24-hour average NAAQS for PM2.5, since each location is performing population-oriented monitoring on a neighborhood scale of representativeness. Specific details of site neighborhoods are given in the previous section, which

explains the rationale for selecting sites in the MPA. Sites to be deployed in 1998 are noted below.

Table 3.2.1 PM2.5 Monitoring Sites to be Deployed in 1998

Site Location	AIRS Site ID	Operating Agency	Spatial Scale	Monitoring Objective	Site Type	Measurement Method
Atascadero- Lewis Avenue	060798001	APCD	Neighborhood	M, HS	C	FRM/SCH
San Luis Obispo- Marsh Street	060792002	ARB	Neighborhood	M	C	FRM/SCH

Codes: Monitoring Objective **M**- to determine maximum concentrations in a populated area; Site Type **C**- Core SLAMS; Measurement Method **FRM/SCH**- Federal reference method single channel sampler

4.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1999

At this time, until workload and cost impacts of performing PM2.5 monitoring are better known, there are no firm plans to expand monitoring in the San Luis Obispo County MPA in 1999, using either FRM samplers, speciation samplers or continuous sampling.

5.0 SAMPLING FREQUENCY

Federal requirements call for everyday sampling for PM2.5 at some core SLAMS and one in three day sampling at other PM2.5 sites. All PM10 sites are required to sample on a one in three day schedule for purposes of determining compliance with federal PM10 standards. Sampling at this frequent rate represents a very large new impact on the staffing and financial resources of the San Luis Obispo County APCD. After evaluating the effective public benefit from frequent sampling against dedication of public resources which are available for all types of ambient air pollutant monitoring which now occurs or is needed in San Luis Obispo County, alternative sampling frequencies are proposed both for PM2.5 and PM10. These alternative sampling frequency proposals also reflect the latest assessments of the unlikely probability that exceedances of the new federal particulate matter standards will be found in the San Luis Obispo County MPA.

5.1 PM2.5 FRM Sampling Frequency

At both PM2.5 sampling sites in the San Luis Obispo County MPA, sampling at a frequency of one in six days is proposed. This strong recommendation is based on review of historical data from PM10 sampling, factored for likely fractions of that PM10 that may be PM2.5. In the event that actual PM2.5 results show unexpected levels of PM2.5, different sampling frequencies will be considered.

Table 5.1.1 PM2.5 Sampling Frequency

Site Location	AIRS Site ID	Sampling Frequency		
		Required	Proposed	
			Time Period	Frequency
Atascadero- Lewis Avenue	060798001	1 in 3 day	1998-1999	1 in 6 day
San Luis Obispo- Marsh Street	060792002	1 in 3 day	1998-1999	1 in 6 day

5.2 PM2.5 Chemical Speciation Sampling Frequency

No chemical speciation sampling is anticipated to occur in the San Luis Obispo County MPA.

5.3 PM10 Sampling Frequency

New federal requirements specify a 1 in 3 day sampling frequency for PM10 sampling. PM10 sampling now occurs at seven sites in San Luis Obispo County on a 1 in 6 day schedule. Sampling at most or all of these seven locations is expected to continue, despite EPA's recent recommendation to downsize PM10 monitoring networks as sampling for PM2.5 begins. No

PM10 sample ever collected in San Luis Obispo County has exceeded the PM10 NAAQS. The California PM10 standards however, which are set at lower, more health-protective levels than are national standards, have been exceeded at times at various sites around the county. Air quality improvement and compliance with the state standards are expected to remain a decisive determinant in continuing broad PM10 sampling throughout this county.

With years of historical records which document attainment of the national PM10 standards by a wide margin in the county, increasing the sampling frequency from 1 in 6 days to 1 in 3 days, at a very high increase in staff workload, supplies and other costs, is clearly unwarranted. Continued sampling for PM10 on the historical 1 in 6 day schedule is proposed. If a subsequent determination of this county's attainment for the NAAQS cannot be maintained at this proposed frequency, the historical record of well-documented attainment for past standards at the 1 in 6 day sampling frequency requirement should be more than sufficient to allow classification of the county.